

Official

RECEIVED
1-3-02

Application No. 09/692,846
Filed 10/19/00
Page 6

--If the natural language interface module 222 detects a user request (Step 416), i.e. a user request (as determined by the PCFG grammar system and device context) is received, it draws one of three conclusions (Steps 420, 422 or 424). According to Step 420, the user request is unambiguously understood and the natural language interface module can comply with a user request. Thus, the natural language interface module 222 carries out the command by sending the appropriate signals via the device interface 210, as indicated by the device abstraction. Then, the context of the speech recognition module 204 and the natural language interface module 206 is switched back to look for attention words (Step 426), before proceeding to Step 404.--

In the Claims:

Please amend claim 1 as follows:

- 202
10/1
A1
cost
1. (Amended) A natural language interface control system for operating a plurality of devices comprising:
 - a 3 dimensional microphone array;
 - a feature extraction module coupled to the first

Application No. 09/692,846
Filed 10/19/00
Page 7

microphone array;

Sub 01
a speech recognition module coupled to the feature extraction module, wherein the speech recognition module utilizes hidden Markov models;

A1
Cancel
a natural language interface module coupled to the speech recognition module; and

a device interface coupled to the natural language interface module, wherein the natural language interface module is for operating a plurality of devices coupled to the device interface based upon non-prompted, open-ended natural language requests from a user.

Please amend claim 5 as follows:

A2
Cancel
5. (Amended) The system of Claim 1 wherein the microphone array comprises said 3 dimensional microphone array further comprising a planar microphone array and at least one linear microphone array located in a different plane in space.

Please amend claim 6 as follows:

Sub CA
6. (Amended) The system of Claim 1 wherein the

Application No. 09/692,846
Filed 10/19/00
Page 8

Sub
CA
A2
Cont

natural language interface abstracts each of the plurality of devices into a respective one of a plurality of grammars and a respective one of a plurality of lexica corresponding to each of the plurality of devices.

Please amend claim 8 as follows:

Sub
CA
A3

8. (Amended) The system of Claim 1 wherein the natural language interface module context switches grammars, acoustic models, and lexica upon receipt and recognition of an attention word.

Please amend claim 13 as follows:

AH

13. The system of Claim 1 further comprising a remote unit containing a first microphone array, the feature extraction module, the speech recognition module, and the natural language interface module, wherein said 3 dimensional microphone array includes the first microphone array.

Please amend claim 15 as follows:

A5
cont

15. (Amended) The system of Claim 14 wherein the base

Application No. 09/692,846
Filed 10/19/00
Page 9

unit includes a second microphone array, wherein said 3 dimensional microphone array includes the second microphone array.

[Please amend claim 16 as follows:]

16. (Amended) The system of Claim 15 wherein the first microphone array and the second microphone array implement said 3 dimensional microphone array.

AS
Cancel
[Please amend claim 17 as follows:]

17. (Amended) A method of speech recognition comprising:

searching for an attention word based on a first context including a first set of models, grammars, and lexica; and

switching, upon finding the attention word, to a second context to search for an open-ended user request, wherein second context includes a second set of models, grammars, and lexicons.

Application No. 09/692,846
Filed 10/19/00
Page 10

Please insert the following new claims:

26. (new) A natural language interface control system for operating a plurality of devices comprising:

a first microphone;

a feature extraction module coupled to the first microphone;

a speech recognition module coupled to the feature extraction module;

a natural language interface module coupled to the speech recognition module;

Ab
Cost
a device interface coupled to the natural language interface module, wherein the natural language interface module is for operating a plurality of devices coupled to the device interface based upon non-prompted, open-ended natural language requests from a user; and

an external network interface coupled to the natural language interface control system.

Application No. 09/692,846
Filed 10/19/00
Page 11

27. (new) The system of Claim 26 further comprising the plurality of devices coupled to the natural language interface module.

28. (new) The system of Claim 26 wherein the speech recognition module utilizes an N gram grammar.

29. (new) The system of Claim 26 wherein the natural language interface module utilizes a probabilistic context free grammar.

30. (new) The system of Claim 26 wherein the microphone array comprises a 3 dimensional microphone array comprising a planar microphone array and at least one linear microphone array located in a different plane in space.

31. (new) The system of Claim 26 wherein the natural language interface abstracts each of the plurality of devices into a respective one of a plurality of grammars and a

A6
CONT

Application No. 09/692,846
Filed 10/19/00
Page 12

respective one of a plurality of lexica corresponding to each of the plurality of devices.

32. (new) The system of Claim 26 wherein the natural language interface module searches for the non-prompted, open-ended user requests upon the receipt and recognition of an attention word.

*As
const*

33. (new) The system of Claim 26 wherein the natural language interface module context switches grammars, acoustic models, and lexica upon receipt and recognition of an attention word.

34. (new) The system of Claim 26 further comprising a grammar module for storing different grammars for each of the plurality of devices.

35. (new) The system of Claim 26 further comprising an acoustic model module for storing different acoustic models for each of the plurality of devices.

Application No. 09/692,846
Filed 10/19/00
Page 13

36. (new) The system of Claim 26 wherein the device interface comprises a wireless device interface.

37. (new) The system of Claim 26 further comprising a remote unit containing the first microphone array, the feature extraction module, the speech recognition module, and the natural language interface module.

Ab
const
38. (new) The system of Claim 37 further comprising a base unit coupled to the remote unit.

39. (new) The system of Claim 38 wherein the base unit includes a second microphone array.

40. (new) The system of Claim 39 wherein the first microphone comprises a first microphone array, and said first microphone array and the second microphone array implement a 3 dimensional microphone array.

Application No. 09/692,846
Filed 10/19/00
Page 14

41. (new) The system of Claim 26 further comprising a central database coupled to said external network interface, said central database including at least one of grammars; speech models; device abstractions; programming information; and lexica.

42. (new) The system of Claim 41 wherein said central database is coupled to said external network interface through an external network.

Ab
cont

43. (new) The system of Claim 42 further comprising:
a remote server coupled to said external network and to said central database.

44. (new) The system of Claim 42 further comprising:
another natural language interface control system; and
another external network interface coupled to said other natural language interface control system, and to said external network.

Application No. 09/692,846

Filed 10/19/00

Page 15

45. (new) A natural language interface control system for operating a plurality of devices comprising:

a first microphone;

a feature extraction, speech recognition and natural language interface module coupled to the first microphone;

a device interface coupled to the feature extraction, speech recognition and natural language interface module, wherein the feature extraction, speech recognition and natural language interface module is for operating at least one device coupled to the device interface based upon non-prompted, open-ended natural language requests; and

an external network interface coupled to the natural language interface control system.

46. (new) The system of Claim 45 further comprising a central database coupled to said external network interface, said central database including at least one of additional grammars; additional hidden Markov models; additional device abstractions; programming information; and lexica.

AB
cont

Application No. 09/692,846
Filed 10/19/00
Page 16

47. (new) The system of Claim 46 wherein said central database is coupled to said external network interface through an external network.

48. (new) The system of Claim 47 further comprising:
a remote server coupled to said external network and to said central database.

49. (new) The system of Claim 47 further comprising:
another natural language interface control system; and
another external network interface coupled to said other natural language interface control system, and to said external network.

50. (new) A method of making a natural language interface control system for operating a plurality of devices comprising:

providing a first microphone;

coupling a feature extraction, speech recognition and natural language interface module to the first microphone;

Ab
Cont

Application No. 09/692,846
Filed 10/19/00
Page 17

coupling a device interface to the feature extraction, speech recognition and natural language interface module, wherein the feature extraction, speech recognition and natural language interface module is for operating at least one device coupled to the device interface based upon non-prompted, open-ended natural language requests; and

coupling an external network interface to the natural language interface control system.

51. (new) The method of Claim 50 further comprising; coupling a central database to said external network interface, said central database including at least one of additional grammars; additional hidden Markov models; additional device abstractions; programming information; and lexica.

52. (new) The method of Claim 51 further comprising coupling said central database to said external network interface through an external network.

53. (new) The method of Claim 52 further comprising:

Application No. 09/692,846
Filed 10/19/00
Page 18

coupling a remote server to said external network and to said central database.

54. (new) The method of Claim 52 further comprising: providing another natural language interface control system; and

coupling another external network interface to said other natural language interface control system, and to said external network.

46
cont
55. (new) A natural language interface control method comprising:

providing a feature extraction, speech recognition and natural language interface module;

coupling the feature extraction, speech recognition and natural language interface module to an external network; and

downloading at least one of grammars; speech models; device abstractions; programming information; and lexica into

Application No. 09/692,846
Filed 10/19/00
Page 19

the feature extraction, speech recognition and natural language interface module through the external network.

56. (new) A natural language interface control method comprising:

*Ab
cancel*
providing a feature extraction, speech recognition and natural language interface module;

coupling the feature extraction, speech recognition and natural language interface module to an external network;
and

transmitting at least one of grammars; speech models; device abstractions; programming information; and lexica from the feature extraction, speech recognition and natural language interface module to the external network.

Cancel claims 18 through 25 without prejudice or disclaimer.

REMARKS